

WHAT IS CLAIMED IS:

1. A mechanism for driving a generator comprising:
at least one pendulum comprising a mass free to pendulate about an axis of oscillation;
an actuator for applying a force to said mass in a direction of pendulation for at least a portion of said pendulation; and
a drive train between said at least one pendulum and the generator for transferring energy between said pendulum and the generator.
2. The mechanism of Claim 1, wherein the generator comprises a drive shaft and said drive train comprises a freewheeling clutch mechanism interposed between said pendulum and said drive shaft such that said drive shaft is driven only in a predetermined direction of rotation.
3. The mechanism of Claim 1, wherein said pendulums have a periodic motion which is substantially harmonic.
4. The mechanism of Claim 1, wherein the generator comprises a drive shaft and said drive train comprises:
a driving member mounted to said at least one pendulum for pendulation therewith;
a wheel, said driving member applying a reciprocating rotational force to said wheel when pendulating, said rotating wheel driving said drive shaft; and
a freewheeling clutch mechanism interposed between said wheel and said drive shaft such that said drive shaft is driven only in a predetermined direction of rotation.

5. The mechanism of Claim 4, wherein said driving member comprises a rack and said wheel comprises a pinion.

6. The mechanism of Claim 4, wherein said wheel comprises a capstan and said driving member comprises a belt wound around said capstan.

7. The mechanism of Claim 4, wherein said wheel comprises a sprocket and said driving member comprises a chain.

8. The mechanism of Claim 4, wherein said drive train further comprises a fly wheel interposed between said freewheeling clutch mechanism and said drive shaft.

9. The mechanism of Claim 1, wherein the generator comprises a drive shaft and wherein said drive train comprises:

a first rack mounted to said at least one pendulum below said axis of oscillation for pendulation therewith;

a first pinion, said first rack applying a reciprocating rotational force to said first pinion when pendulating, said rotating first pinion driving said drive shaft, wherein a first freewheeling clutch mechanism is interposed between said first pinion and said drive shaft such that said drive shaft is driven only in a predetermined direction of rotation;

a second rack mounted to said at least one pendulum above said axis of oscillation for pendulation therewith; and

a second gear, said second rack applying a reciprocating rotational force to said second gear when pendulating, said rotating second gear driving said drive shaft, wherein a second

freewheeling clutch mechanism is interposed between said second gear and said drive shaft such that said drive shaft is driven only in said predetermined direction of rotation;

10. The mechanism of Claim 1, comprising two pendulums wherein said pendulums have an angular velocity which is substantially 90° out of phase.

11. The mechanism of Claim 1, comprising a plurality of pendulums, wherein successive ones of said pendulums have an angular velocity which is substantially $180^\circ/N$ out of phase and wherein N is the number of pendulums.

12. The mechanism of Claim 1, further comprising a phase angle maintaining mechanism interposed between said pendulums.

13. The mechanism of Claim 1, wherein said actuator is positioned at an end of said path of travel.

14. The mechanism of Claim 1, wherein said actuator comprises:
a source of energy; and
a stop for controllably releasing said energy; and
wherein when said mass reaches a predetermined position along said path of travel, said stop is removed, thereby releasing said energy, said released energy being applied to said mass in a direction of pendulation.

15. The mechanism of Claim 14, wherein said actuator further comprises a piston interposed between said source of energy and said mass,

and wherein when said stop is released, said piston is conveyed by said source of energy from a cocked position to a released position.

16. The mechanism of Claim 14, wherein said source of energy is a gas under pressure, said actuator further comprises a nozzle for directing said gas in a stream and wherein when said stop is released, said stream is directed by onto said mass.

17. The mechanism of Claim 16, wherein said gas under pressure is compressed air.

18. The mechanism of Claim 15, wherein said source of energy is a spring.

19. The mechanism of Claim 15, wherein said source of energy is selected from the group consisting of elastic, pneumatic, hydraulic and magnetic.

20. The mechanism of Claim 15, wherein said actuator further comprises a second source of energy for conveying said piston from said released position to said cocked position.

21. The mechanism of Claim 20, wherein said second source of energy is a hand operated lever.

22. The mechanism of Claim 20, wherein said second source of energy is an electrically activated solenoid.

23. The mechanism of Claim 20, wherein said second source of energy is an pneumatically operated piston.

24. The mechanism of Claim 20, wherein said second source of energy is a hydraulically operated piston.

25. The mechanism of Claim 1, wherein said mass is fabricated from a ferrous material and said actuator comprises:

at least one electro magnetic; and

a source of electrical energy; and

wherein when said mass is travelling towards said electro-magnet and reaches a predetermined position along said path of travel, said source of electrical energy is applied to said electro magnets, thereby attracting said mass to said electro-magnet.

26. The mechanism of Claim 1, wherein said mass is fabricated from a magnetic material and said actuator comprises:

at least one electro magnet; and

a source of electrical energy; and

wherein when said mass is travelling away from said electro-magnet and reaches a predetermined position along said path of travel, said source of electrical energy is applied to said electro magnets, thereby repelling said mass from said electro-magnet.

27. The mechanism of Claim 1, wherein said mass is fabricated from a magnetic material and said actuator comprises:

at least one electro magnetic; and

a source of electrical energy; and

wherein when said mass travelling towards said electro-magnet reaches a predetermined position along said path of travel, said source of electrical energy is applied to said electro magnets, thereby attracting said mass to said electro-magnet.

28. A mechanism for driving a driveshaft comprising:
at least two pendulums, wherein successive ones of said pendulums have an angular velocity that is substantially $180^\circ/N$ out of phase and N is the number of pendulums; and
a drive train between said pendulums and the driveshaft for transferring energy between said pendulums and the driveshaft.

29. The mechanism of Claim 28, comprising two pendulums, said two pendulums having angular velocities being substantially 90° out of phase.

30. The mechanism of Claim 28, comprising three pendulums, successive ones of said three pendulums have angular velocities substantially 60° out of phase.

31. The mechanism of Claim 28, further comprising a phase angle maintaining mechanism interposed between said pendulums, said phase angle maintaining mechanism maintaining the angular velocity of successive pendulums out of phase substantially at a predetermined phase angle.

32. A drive train for transferring energy between a pendulum and a drive shaft, the drive train comprising:
a driving member mounted to the pendulum for pendulation therewith;

a wheel, said driving member applying a reciprocating rotational force to said wheel when pendulating, said rotating wheel driving the drive shaft; and

a freewheeling clutch mechanism interposed between said wheel and said drive shaft such that the drive shaft is driven only in a predetermined direction of rotation.

33. The drive train of Claim 31, further comprising a fly wheel interposed between said freewheeling clutch mechanism and said drive shaft.

34. The drive train of Claim 31, wherein said driving member comprises a rack and said wheel comprises a pinion.

35. A system for generating electricity, the system comprising:
a generator;
at least one pendulum comprising a mass, said mass free to pendulate about an axis of oscillation;
an actuator for applying a force to said mass in a direction of pendulation for at least a portion of said pendulation; and
a drive train between said pendulum and said generator for transferring energy between said pendulum and said generator.

36. A method for driving a generator comprising the steps of:
providing at least one pendulum comprising a mass free to pendulate about an axis of oscillation;
applying a force to said mass in a direction of pendulation for at least a portion of said pendulation;
interconnecting a drive shaft with the generator such that the generator rotates therewith; and

converting said pendulation into a rotational movement using a drive train, said drive train rotating said driveshaft in a predetermined direction of rotation.

37. The method of Claim 36, wherein said drive train comprises: a driving member mounted to said pendulum for pendulation therewith; a wheel, said driving member rotating said wheel when said pendulum is pendulating, said rotating wheel driving said drive shaft; and a freewheeling clutch mechanism interposed between said wheel and said drive shaft such that said drive shaft is driven in said predetermined direction of rotation.